

**Draft Summary of the Engineering and Operations Work Group Meeting  
Oroville Facilities Relicensing (FERC Project No. 2100)  
June 25, 2001**

The Department of Water Resources (DWR) hosted the Engineering and Operations Work Group on June 25, 2001 in Oroville.

A summary of the discussion, decisions made, and action items is provided below. This summary is not intended to be a transcript, analysis of the meeting, or to indicate agreement or disagreement with any of the items summarized, except where expressly stated. The intent is to present a summary of the discussion for information purposes for interested parties who could not attend the meeting.

### **Introduction**

Attendees were welcomed to the Engineering and Operations Work Group meeting. The meeting objectives were discussed. The meeting agenda and list of attendees and their affiliations are appended to this summary as Attachments 1 and 2, respectively. Flip Chart notes are included as Attachment 3.

### **Action Items – May 25, 2001 Engineering and Operations Work Group Meeting**

A summary of the May 25, 2001 Engineering and Operations Work Group is posted on the relicensing web site. The Facilitator reviewed the status of action items from the May 25, 2001 Engineering and Operations Work Group meeting as follows:

- Action Item #EO18**      Prepare a simple graphic showing the relationship between power and water costs in the north versus the south part of the state.
- Status:**                Work on developing the graphic is continuing and should be ready by the July Engineering and Operations Work Group meeting. Craig Jones of the State Water Contractors asked if Butte County was taking its full allocation of water this year. Ed Craddock from Butte County explained that their delivery has been reduced to 3,500 acre-feet from 27,000 acre-feet. He expressed concern about an agreement that could affect Butte County's allocation dependant on if they used the water or not. The SWC had supported this position but recent litigation had cast doubt on the agreement.
- Action Item #EO19**      Revise Issue Sheets for distribution to the Engineering and Operations Work Group.
- Status:**                Revised Issue Sheets will be distributed to the Engineering and Operations Work Group at today's meeting as part of a later agenda item.

### **Meeting Calendar**

The Facilitator provided the Engineering and Operations Work Group with a calendar containing the dates and times of all Work Group and Plenary Group meetings set through February 2002. The calendar is appended to this summary as Attachment 4.

### **Meeting Schedule**

In response to several participants' concerns with the current meeting schedule, the Engineering and Operations Work Group reviewed and revised their schedule of meetings through October 2001 to the following dates:

Tuesday July 31, 2001  
Wednesday August 29, 2001  
Wednesday October 3, 2001 (September meeting)  
Tuesday October 30, 2001

## **Presentation on Real-Time Forecasting**

At the April 26, 2001 Engineering and Operations Work Group meeting, a request was made to DWR to prepare a presentation regarding their flood management program, including how DWR coordinates its reservoir operations with weather forecasts from the National Weather Service (NWS) and other governmental agencies. Additionally, DWR was asked to provide information on how it utilizes “real-time” snow-pack and storm-runoff data to determine how water is stored in and released from Oroville Reservoir.

In response to this request, Curtis Creel of DWR asked his staff and NWS staff to describe how they gather, store, share and utilize information to help determine operations at the Oroville Facilities. Curtis reported to the Engineering and Operations Work Group that DWR, NWS and Bureau of Reclamation (BOR) provide coordinated support for flood forecasting and system operations at the Joint Operations Center (JOC) in Sacramento. The JOC was developed so that the system operators (DWR and BOR) and the weather forecasting agency (NWS) could work closely and share critical information for general operations as well as during times of heavy storm runoff. He also described the California Data Exchange Center (CDEC), which collects and disseminates a variety of statewide weather data for public and agency use.

### *Water Supply Forecasting*

Maurice Roos of DWR provided the Operations and Engineering Work Group with an overview of predictive modeling techniques used by DWR. He described the factors that in aggregate are used to determine the water supply forecast; the information presented by Maurice is appended to this summary as Attachment 5. These factors include snow pack water content, current year’s precipitation, previous year runoff, current year runoff, and historical precipitation and runoff information. The various components are entered into a regression formula that provides a trend for the upcoming runoff year. Oroville Facilities’ operations are then determined based on the forecast.

Maurice added that the most significant components of the equation are current year snow pack water content and current year precipitation and runoff data. Information is collected by both on-the-ground snow pack surveys for end of month data, and mid-month measurements reported by automatic methods using “snow pillows”. Precipitation is measured at 8 to 10 stations throughout the watershed. Runoff data is collected at gauging stations above the reservoir. He emphasized that runoff data is impaired since there are reservoirs above Lake Oroville that regulate the flow of water downstream. He added that early season precipitation data is less valuable than late season data in forecasting water supply (i.e. a very wet early rain season does not necessarily predict a wet rain year).

Maurice shared information regarding historic runoff data in the watershed, showing a downward trend in total runoff over the past 80 years.

- ♦ One participant asked if there was a correlation between the percentage of watershed vegetation and water storage. Maurice responded that there appeared to be little correlation between the two. He added that watershed storage was more closely related to overall temperature, and that a trend toward warmer temperatures would result in a snow pack that melted earlier in the season making it more difficult to provide flood protection and consistent lake levels.
- ♦ One participant asked if the forecasting formulas could be improved upon with better rain forecasting methods. Maurice agreed that better forecasting would be valuable but cautioned that long-range forecasting beyond 5 to 7 days is problematic.

### *Flood Forecasting*

Rob Hartman of the National Weather Service explained that the goal of his agency is to develop data and information that protects lives and property from flooding. Rob's presentation is appended to this summary as Attachment 6. To that end, the NWS, DWR and BOR have developed a unique, cooperative program to share river flow, precipitation and other data. He described facilities throughout the state where the NWS gathers critical data to help develop various forecasts. He added that information sources and modeling techniques are constantly updated to provide the most useful and timely information possible. He emphasized that the NWS is constantly comparing predictions against observed data to help refine their techniques.

The NWS provides two types of information: 1) general information regarding the weather for the public, and 2) internal model runs covering a five-day period to water management agencies. The goal of providing timely model run information is to give local governments and water management agencies data that can help them with facilities operations and emergency services. Rob added that the NWS also provides long-term weather forecasting which he admitted was problematic at best. He mentioned that the NWS had predicted a drier than average year for the current rain year (July 2000 to June 2001), but had not predicted the severity of the drought. In some years the indicators used to make long-term forecasts are clear while in other years they are not. The lack of clear reliable indicators makes it difficult to produce accurate forecasts related to severity of either drought or flooding.

- ♦ One Participant asked if the NWS also worked on drought scenarios during dry years. Rob responded that while the emphasis was on flood forecasting, during dry years there was a natural interest in drought forecasting. He added that NWS is refining its models to reflect dry year scenarios.
- ♦ Ed Craddock asked how evapo-transpiration is figured into the April through June runoff estimates. Rob responded that they use an atmospheric demand factor, depending on ground moisture. He added that the model is continually updated utilizing the most current information but cautioned that there were limitations to the model's ability to predict ground moisture levels.
- ♦ One participant asked if vegetation in the watershed affects their forecasts. Rob responded that vegetation in the watershed has no effect on precipitation forecasting but does have an effect on watershed water retention. He stressed that determining watershed retention is very difficult and includes many variables including vegetation (e.g. transpiration rates).
- ♦ One participant asked if the Oroville Facilities were being operated this year using the dryer than normal predictions and pointed out that the low water levels this year are having an adverse effect on the local business community. Rob responded that NWS information is provided to the operators, but that the NWS does not participate in operational decisions. Maurice Roos added that since January, most of the releases from Oroville have been in response to water quality requirements in the SF Bay-Delta and therefore outside of DWR's control.

### *Hydrologic Data Exchange*

Dave Parker of DWR described the California Data Exchange Center (CDEC) and how it provides centralized data support to DWR and the NWS, as well as to the public. He explained the objectives of the CDEC are to collect and disseminate hydrologic and weather information, provide a centralized database for user access, and provide an early flood warning system; the presentation is appended to this summary as Attachment 7. Dave outlined some of the basic uses of the data for early flood warning, river level monitoring, water supply forecasting, planning reservoir releases, monitoring Bay-Delta water quality, and recreational uses of waterways.

The essential function of CDEC is to distribute hydrologic database information collected by a number of real-time collection sources to water management agencies throughout the state. The

CDEC also provides a data exchange function for the agencies that it works with. He listed several agencies for which the CDEC facilitates data exchange including DWR, NWS, BOR, and the Sacramento Municipal Utilities District.

He emphasized that the CDEC provides dynamic hydrologic information directly to agencies and through its web site to the public ([www.cdec.water.ca.gov](http://www.cdec.water.ca.gov)). The information is available in a number of formats including plots, pictures, photos, and maps. He added that the CDEC web site is updated on a continuous basis as information is made available. Dave stressed that all the information collected and distributed through CDEC is checked for accuracy before it is included in the database and they do not manipulate the data. DWR's Bulletin 120 is appended to this summary as Attachment 8 and is also updated regularly on CDEC. The URL address is <http://cdec.water.ca.gov/cgi-progs/iudir/B120>.

- ♦ Mike Morse of FWS asked if CDEC automatically picks up US Geological Survey data. Dave responded that their program automatically picks up USGS data.

### *Oroville Facilities Operations*

John Leahigh of DWR outlined how the data and processes described above are integrated into a plan for operating the Oroville Facilities while responding to specific hydrologic and climate conditions; John's presentation is appended to this summary as Attachment 9. John reiterated concepts shared during previous meetings, including how water is collected and released from Oroville Facilities based on a series of operational criteria, tempered by current water supply forecasts. For example, during the current year with approximately 65% of normal rainfall and snow pack, the primary operational imperative is to deliver adequate flows to the Bay-Delta to maintain environmental standards. Additionally, water will be provided to the Feather River Service area, a senior water rights holder, but only a percentage of annual allotments will be made available to the State Water Contractors.

John added that most forecasting and modeling is designed to respond to normal rainfall years with an emphasis on protecting lives and property during flood risk scenarios. Drought scenarios with limited runoff severely limit the operational flexibility of the project and tend to increase collateral impacts on water levels in the reservoir.

- ♦ One participant asked if local water diversions that eventually find themselves back in the river are accounted for in the operation of the Oroville Facilities. John responded that Sacramento Valley accretions are considered but do not completely cancel out diversions. If local water re-enters the system and runs through the Delta, it indirectly affects the amount of water released from the Oroville Facilities for such purposes.
- ♦ One participant asked what delay there was between the onset of a storm event in the watershed and runoff increases. Maurice responded that the lag time is measured in hours between a storm and increases in runoff.

### **Review and Revise Issue Sheets**

The Engineering and Operations Work Group received revised draft Issue Sheets developed by DWR; the Issue Sheets reflect comments made by the Engineering and Operations Work Group at its previous meeting. The draft Issue Sheets included draft descriptions for Scope, Resource Goals, Existing Information, Information Needs, Level of Analysis and Issues Addressed for each Issue Statement.

The Facilitator provided a brief overview of the elements of an Issue Sheet and how Issue Sheet development fits with other Engineering and Operations Work Group activities such as scoping document preparation and study plan development. She emphasized that the Issue Sheets are working documents for the Engineering and Operations Work Group to use while crafting study

plans. The draft Issue Sheets with comments from this meeting are appended to this Summary as Attachment 10.

- ♦ The Engineering and Operations Work Group discussed what constitutes a Resource Goal and whether the Resource Goal should be written as a problem statement or a neutral statement. Wayne Dyok from the consulting team explained that a Resource Goal is a statement of what someone wants to get from the resource, and should be stated as broadly as possible. Craig Jones of the State Water Contractors responded that the Engineering and Operations Work Group should focus on issues related to the operation of the Oroville Facilities. Identifying too broad a range of Resource Goals could create an unnecessarily large study area.
- ♦ Engineering and Operations Work Group participants discussed their thoughts on the appropriate study area and the limits of significant impact. Participants agreed Geographic Scope should be addressed on an issue-by-issue basis.
- ♦ The Engineering and Operations Work Group discussed release scenarios, including coordination with facilities of the Central Valley Project, to facilitate fish migration and how they may be impacted during dry years. Don Marquez of the Kern County Water Agency reminded the group that water exports are subordinate to releases for fish flow and Bay-Delta standards. He added that any coordination would have to work within existing agreements.
- ♦ The Engineering and Operations Work Group developed a Task Force to review the draft Issue Sheets and, utilizing comments and recommendations to date, develop draft recommendations for Information Needs and Level of Analysis. Task Force members include:

Craig Jones  
Don Marquez  
Koll Buer (Jerry Boles)  
Dave Ferguson  
Michael Morse  
Steve Edmondson  
Sharon Stohrer  
Curtis Creel  
Art Hinojosa

- ♦ The Task Force agreed to meet via teleconference on July 9, 2001 at 11 a.m., at the Oroville Field Division Conference Room and the Joint Operations Center and DWR's Headquarters offices in Sacramento. The Task Force will report back to the Engineering and Operations Work Group at their July 31, 2001 meeting with revised draft Preliminary Issue Sheets.

### **Next Meeting**

The Work Group agreed to meet on:

Date: Tuesday, July 31, 2001  
Time: 9:30 a.m. to 3 p.m.  
Location: Oroville Field Division

### **Agreements Made**

1. The Engineering and Operation Work Group agreed to initiate a Task Force charged with further development of the Issue Sheets based on participant comments to date. The Task Force will report to the Engineering and Operations Work Group at their July 31, 2001 meeting.
2. The Engineering and Operations Work Group agreed to meet again on July 31, 2001 from 9:30 a.m. to 3 p.m. at the Oroville Field Division.

3. The Engineering and Operations Work Group agreed to the following meeting dates:  
Wednesday August 29, 2001, Wednesday October 3, 2001(September meeting) and Tuesday  
October 30, 2001.

#### **Action Items**

The following list of action items identified by the Engineering and Operations Work Group includes a description of the action, the participant responsible for the action, and due date.

**Action Item #EO20:** Review draft Issue Sheets and utilize comments and recommendations from Engineering and Operations Work Group participants to develop draft recommendations for Information Needs and Level of Analysis as needed.

**Responsible:** Task Force

**Due Date:** July 24, 2001

**Action Item #EO21:** Confirm meeting dates for November and December and check in with Ralph Torres regarding future meeting schedule.

**Responsible:** DWR

**Due Date:** Post on project web site when available.

#### **Carryover Action Item:**

**Action Item #EO18** Prepare a simple graphic showing the relationship between power and water costs in the north versus the south part of the state.

**Due Date:** July 24, 2001